



**BOEING REALTY CORPORATION  
FORMER C-6 FACILITY  
LOS ANGELES, CALIFORNIA**

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**TECHNICAL MEMORANDUM**

**TEMPORARY GROUNDWATER MONITORING WELL  
CONVERSION**

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**To: Mr. Brian Mossman  
Boeing Realty Corporation  
3855 Lakewood Blvd.  
Building 1A MC D001-0097  
Long Beach, CA 90846**

**From: Haley & Aldrich, Inc.**

**Date: March 29, 2002**

**Re: Temporary Groundwater Monitoring Well Conversion Report, Boeing Realty Corporation,  
Former C-6 Facility, Los Angeles, California**

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Haley & Aldrich, Inc. has prepared this technical memorandum summarizing field activities during the conversion of nine Temporary Monitoring Wells (TMWs) to permanent groundwater monitoring wells at the former Boeing C-6 Facility (subject property), in Los Angeles, California (Figure 1).

Wells TMW-1 through TMW-9 were installed as temporary groundwater monitoring wells by Kennedy/Jenks Consultants (Kennedy/Jenks) in 1998 as part of a program to obtain preliminary groundwater quality data at locations within Parcel C of the subject property. The locations of the wells and former locations of the buildings are shown on Figure 2. Since the wells were intended to be temporary, the annular space between the filter pack bentonite seal and the surface seal was not grouted. These wells, however, have become part of the site-wide groundwater monitoring program and were converted to permanent groundwater monitoring wells on 20 November 2001 by grouting the annular space. The following sections discuss the well conversion activities.

## **1.0 BACKGROUND**

### **1.1 SITE LOCATION AND DESCRIPTION**

The subject property comprises approximately 170 acres at 19503 South Normandie Avenue in Los Angeles, California. The subject property is bordered on the north by West 190th Street; on the east by South Normandie Avenue; on the south by Montrose Chemical Company; and on the west by Western Avenue, the former Capitol Metals, and International Light Metals facilities.

The Douglas Aircraft Company used the facility to manufacture aircraft and aircraft components from 1952 until approximately 1992. The site was purchased by the Boeing Company in 1997 and was vacated in 1998 to facilitate redevelopment. Aboveground and underground structures have been removed and the site has been graded.

Boeing Realty Corporation  
3760 Kilroy Airport Way, Suite 500  
Long Beach, CA 90806  
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04 April 2002  
C6-BRC-T-02-006



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
Los Angeles Region  
320 W. 4<sup>th</sup> Street, Suite 200  
Los Angeles, CA 90013

Attention: John Geroch

Subject: **TEMPORARY GROUNDWATER MONITORING WELL  
CONVERSION REPORT, FOR BOEING REALTY CORPORATION,  
FORMER C-6 FACILITY, 19503 SOUTH NORMANDIE AVENUE,  
LOS ANGELES, CA**

Dear Mr. Geroch:

Please find enclosed for your review, a copy of the subject document prepared by  
Haley & Aldrich for Boeing Realty Corporation.

If you have any questions concerning this document, please contact the undersigned  
at 562-593-8623.

Sincerely,

A handwritten signature in black ink, appearing to read "Stephanie Sibbett".

Stephanie Sibbett  
Boeing Realty Corporation

Cc: Mario Stavale, Boeing Realty Corporation

enclosure

## **1.2 HYDROGEOLOGY/GEOLOGY**

The hydrogeologic units relevant to this scope of work are comprised of Holocene and Pleistocene-age alluvium deposits. The upper portions of the subject property geology from ground surface to approximately 140 feet below ground surface (bgs) are composed of the Bellflower Aquiclude consisting of clays, silts, and fine sands (Montgomery Watson, 1994).

At the subject property, groundwater occurs at approximately 60 to 70 feet bgs in a semi-perched aquifer flowing south-southeast at an approximate hydraulic gradient of 0.0007 feet per foot (ft/ft) to 0.0027 ft/ft (Kennedy/Jenks 2000b). Groundwater at the subject property is primarily impacted with the volatile organic compounds trichloroethene (TCE), 1,1-dichloroethylene (1,1-DCE), and 1,1,1-trichloroethane (1,1,1-TCA).

## **2.0 WELL CONVERSION SCOPE OF WORK**

The nine TMWs were designed and installed to evaluate shallow groundwater quality within Parcel C of the subject property. As such, the wells were designed to penetrate no deeper than 20 feet into the water table. The annular spaces of the boreholes were left open from approximately 56-feet bgs to within approximately two feet of the surface. The upper two feet of the boreholes were reportedly packed and filled with hydrated bentonite pellets to the surface as described in the Kennedy/Jenks TMW boring logs in Appendix A (Kennedy/Jenks, 1999).

The subject property is currently being redeveloped, however, these wells are part of a continuing groundwater monitoring program. To minimize the potential for surface water infiltration through the ungrouted annular spaces, Haley & Aldrich converted the TMWs to permanent groundwater monitoring wells according to a Work Plan verbally approved by the California Regional Water Quality Control Board, Los Angeles Region (LARWQCB) on November 12, 2001. A copy of the LARWQCB approval letter is included in Appendix C.

Activities associated with the conversion included the removal and inspection of the well vaults and existing surface seal, grouting the annular spaces, and providing surface protection for the nine TMWs. Well conversion activities were performed in general accordance with State of California Water Well Standards as described in Bulletins 74-81 and 74-90.

### **2.1 WELL HEAD REMOVAL AND INSPECTION**

Prior to grouting, existing well vaults and/or the upper bentonite surface seal were removed to expose the well annulus. All of the TMWs are constructed of 2-inch inside diameter (ID), Schedule 40, PVC screen and casing. TMW-2, TMW-4, and TMW-8 had partially buried well vaults that were held in place with concrete and did not have an upper bentonite seal. TMW-1 and TMW-5 had a well vault embedded tightly into the soil around the well casing, with no concrete or bentonite surface seal. TMW-3 had a concrete slab and a piece of black plastic tarp pressed into the well annulus, but the well vault had been removed previously. TMW-7 had a piece of clear plastic sheeting pressed into the well annulus with approximately three inches of bentonite pellets above it forming a surface seal. TMW-6 and TMW-9 were covered with 55-gallon drums, but the well vaults had been removed previously and there was no upper plastic or bentonite surface seal.

Each PVC well casing was checked for competency. This involved lightly pulling on the casing to determine if the casing was cracked or broken. None of the casings appeared to be cracked. The depth of the open annulus was measured to verify the accuracy of the well construction log and to assist in calculating the volume of annular seal grout needed. The well annulus measurements are summarized below:

WELL ID	Reported Open Annulus* (feet bgs)	Measured Open Annulus (feet bgs)
TMW-1	56	26
TMW-2	51	23
TMW-3	58	37
TMW-4	56	30
TMW-5	56	40
TMW-6	56.5	35
TMW-7	56	38
TMW-8	56	40
TMW-9	56.5	40

\* Value Reported in Kennedy/Jenks Well Construction Logs when installed in 1998.

Current open annular space measurements indicate that the TMW boreholes have partially collapsed since installation in 1998.

## 2.2 ANNULAR SPACE GROUTING

The approximate volume of grout required to fill the annulus from the filter pack bentonite seal to approximately two feet below expected final grade was calculated prior to mixing grout. Neat cement grout (ASTM C150 – Type I/II Portland Cement) was mixed at a ratio of one 94-pound sack of Portland cement to 5 to 6 gallons of potable water. The grout was mixed in a clean 55-gallon drum using a pneumatic mixing device to provide uniformity and ensure that no lumps exist. The grout was then pumped through a 1.5-inch PVC tremie pipe lowered to the bottom of the well annulus, filling the annulus from the bottom up. The volume of grout placed in the well annulus was recorded. The grout seal was observed for subsidence and “topped-off” as needed to maintain the grout seal within two feet of the ground surface. A summary of the calculated grout volume and total grout used is provided below:

Well ID	Calculated Volume of Grout (cubic feet)	Total Volume of Grout Used (cubic feet)
TMW-1	7.8	8.4
TMW-2	6.9	10.0
TMW-3	11.4	13.4
TMW-4	9.2	10.0
TMW-5	12.4	11.7
TMW-6	10.8	13.4
TMW-7	11.8	13.4
TMW-8	12.4	13.4
TMW-9	12.4	15.0

With the exception of TMW-5, each borehole required more than the estimated amount of grout to fill to 2 feet bgs. It is assumed that the additional grout used was due to filling in the voids of the partially collapsed borehole and loss of grout to the geologic formation. The grout was allowed to settle for several hours. The upper annulus was then filled with hydrated bentonite chips to present site grade.

## 2.3 SURFACE COMPLETION

Due to continued grading and redevelopment activities on the subject property, the tops of several TMW well casings were below present site grade in surface depressions. To prevent surface water from infiltrating the

well casing or the newly-grouted annular space, the existing PVC well casings were extended to approximately one foot above present site grade using matching diameter, schedule 40, PVC well casing secured with PVC slip couplers and stainless steel screws. Well casing elevations will be surveyed to an accuracy of 0.01 foot relative to mean sea level by Tait & Associates, Inc. prior to the March 2002 groundwater sampling event. Well casing extension lengths are summarized below:

WELL ID	Approximate PVC Well Casing Extension Added (Feet)
TMW-1	6'
TMW-2	7'
TMW-5	2'
TMW-6	7'
TMW-8	3'

Ten-inch diameter Sonotube forms were placed around the PVC well casing from the ground surface to present site grade. The Sonotubes were then filled with bentonite chips to provide a surface seal and structural support during the compaction of soil around the well. Depressions around the wells were backfilled and compacted by a backhoe with a wheel compactor on November 27 and 28, 2001. Since subject property grading and redevelopment activities are continuing, temporary surface completions were installed. These temporary surface completions consist of a mounded bentonite surface seal to divert surface water, locking well caps, and safety-orange barricade fencing to protect them from truck and equipment. A typical temporary surface completion is shown in Figure 3.

At the completion of subject property redevelopment and establishment of final surface grade, permanent surface protection will be installed consisting of a flush-mount well vault for wells within traffic areas or an aboveground locking protective casing for wells in landscaped areas. A typical flush-mount well vault and aboveground protective casing is shown in Figure 3.

### 3.0 PERMITTING

Installation of the temporary monitoring wells (TMW-1 through TMW-9) was approved by the LARWQCB on May 20, 1998 (Appendix B). Installation of the nine temporary wells (TMW-1 through TMW-9) was permitted by the County of Los Angeles Department of Health on June 25, 1998. Conversion of the nine temporary monitoring wells was verbally approved by the LARWQCB on November 12, 2001 (Appendix C). No further permitting was required for the conversion of these wells.

### 4.0 CONCLUSION

Nine temporary groundwater monitoring wells were converted to permanent groundwater monitoring wells on 20 November 2001. The annular spaces of the boreholes above the filter pack screen were grouted with Portland cement grout to prevent water migration through the open annulus. Wells casings were extended to present site grade where necessary, and soil depressions were backfilled and compacted. Temporary surface protection has been provided for the nine TMWs. Permanent well vaults or locking protective casings will be installed as part of future site development.

We appreciate this opportunity to be of service. If you have any questions, please do not hesitate to contact the undersigned.

Sincerely yours,  
HALEY & ALDRICH, INC.

Richard M. Farson, P.E.  
Senior Engineer

Scott P. Zachary  
Vice President



Figures:      Figure 1 – Site Location Map  
                  Figure 2 – Site Plan  
                  Figure 3 – Well Completion Details

Appendices:   Appendix A – TMW Boring Logs  
                  Appendix B – TMW Installation Approval Letter  
                  Appendix C – TMW Conversion Approval Letter

References:    Kennedy/Jenks. 1999. Installation of Temporary Monitoring Wells Area of Buildings 1 and 2. Volume 1. Boeing Realty Corporation, C-6 Facility. Los Angeles, California. October.

Kennedy/Jenks. 2000b. Groundwater Monitoring Report, 2nd Quarter 2000, Boeing Realty Corporation's C-6 Facility, Los Angeles, CA. July.

Montgomery Watson. 1994. Conceptual Design of Final Soil and Groundwater Remediation System at the Douglas Aircraft Company. March.

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